

Oil boiler Instruction Manual

Installation, Maintenance and User Guide



MODEL

NHC 25B/30B/41B

- Read the instructions fully before installing or using the appliance.
 - INSTALLER, this manual to be affixed adjacent to the boiler.
 - CONSUMER, retain this manual for future reference purposes.
 - Constant development efforts may result in minor deviations in illustrations, functional steps and technical data without prior notice.
 - Pictures and drawings in the instructions can be different from the appliance.
- All product images are provided by the manufacturer and are for reference purposes only.

SATURN

Instruction Manual

SATURN

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Safety Instructions

Safety-related messages and instructions have been provided in this manual and on the boiler to warn you and others of a potential injury hazard. Read and follow all safety messages and instructions throughout this manual. It is very important to understand this safety section for operating, installing and servicing of boiler.



This is a safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



DANGER

Indicates an imminently hazardous situation which, if not avoided, could result in severe injury or death.



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in severe injury or death.



CAUTION

Indicates an imminently hazardous situation which, if not avoided, could result in minor moderate injury.

Meaning of symbols in the guide for use



Earth



Caution when dismantling



Use off fire
forbidden



Dangerous
electric current

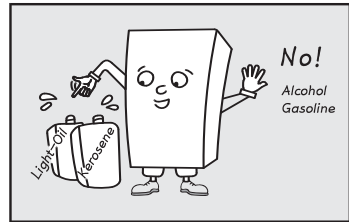


Touching is
forbidden

Before using the boiler

Fuel

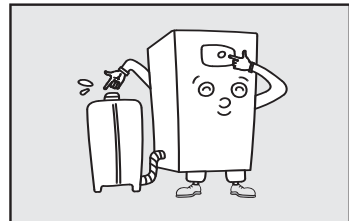
It is essential to use only kerosene or light oil.
It is better to use kerosene when the temperature can drop below -5°C .



Choose a fuel storage location in accordance with local regulations. Take care to avoid the ingress of water and/or dirt during re-filling as this can lead to flame failure or affect the lifespan of the boiler.

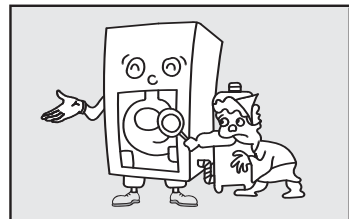


Ensure that the power is turned off and the oil tank is isolated before refilling.

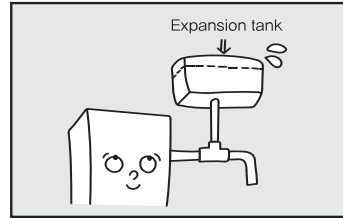


Pre-StartChecks

Check all pipe connections thoroughly for leaks before start-up.

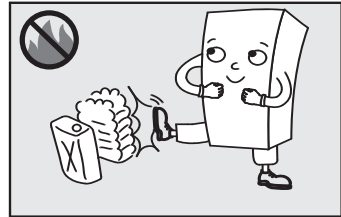


Ensure that there is sufficient water in the system and that the low water level alarm is not activated.

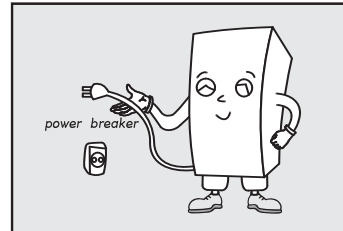


Notes when using

Take care when positioning the boiler. Do not locate in the immediate vicinity of flammable materials.

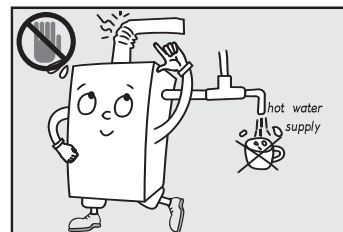


Confirm that the ignition and combustion of the boiler are normal. Use the flue gas test port and suitable measurement equipment to ensure correct combustion is taking place. If the boiler is not being used for extended periods turn off the power via the controller. Do not plug out the boiler as this will de-activate the frost protection.



Avoid contact with the flue outlet.

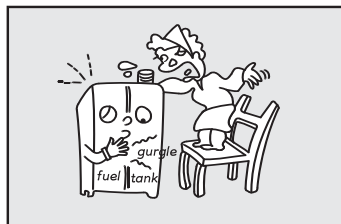
The domestic hot water supply is not recommended for potable use.



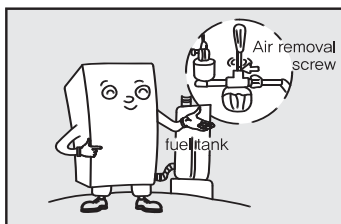
How to use

Purging the oil supply

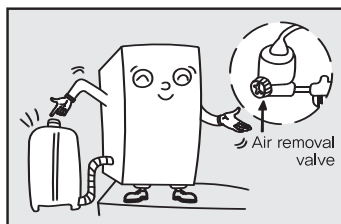
Avoid complete emptying of the oil tank. This can lead to air being introduced to the fuel system and may result in ignition failure.



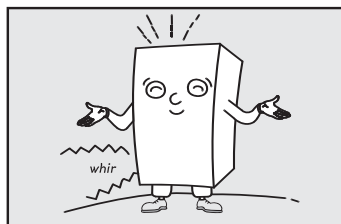
Loosen the screw in the oil filter. This will allow the fuel supply line to vent. When oil starts to flow re-tighten the screw (this is only possible in positive head oil supply applications).



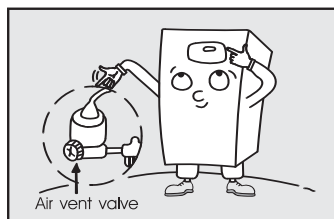
In negative head oil supply applications the fuel supply line must be purged using the oil pump vent screw. For this the oil filter screw must be in the tightened position.



Open the oil pump vent screw and switch on the power to the boiler. After 6-7 seconds the pump has purged the air and the "CHECK" light will show on the control panel. The boiler will stop.

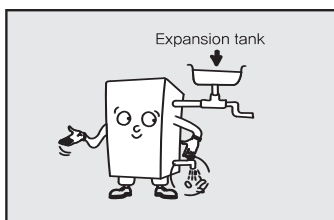


Press the power button on the control panel repeatedly until the oil flow is constant. Close the oil pump vent screw, press the power button again and the boiler will ignite. If the boiler fails to fire after 3 successive attempts contact the Technical.

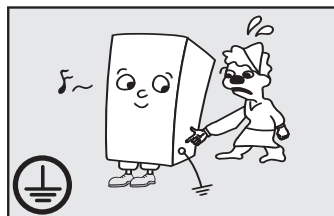


Preparation and checking before start-up

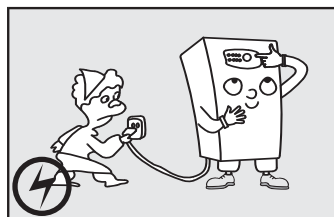
Ensure the system is full and at suitable operation pressures. Fill and thoroughly purge all connected pipework.



The boiler must always be correctly grounded according to relevant local regulations.

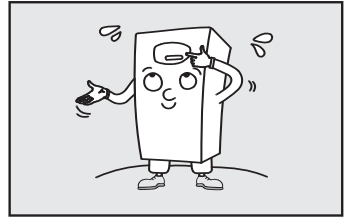


Connect the boiler to the main 220v supply and press the power button. The "RUN" light should show after a short period.

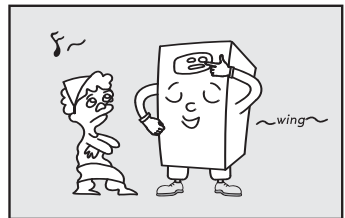


How to use

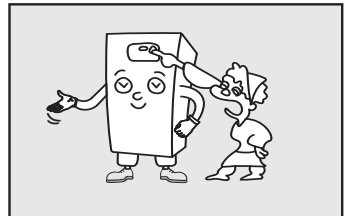
Set the temperature on the main control panel to the desired operation temperature.



Press the power button to start the fan motor and the boiler combustion.



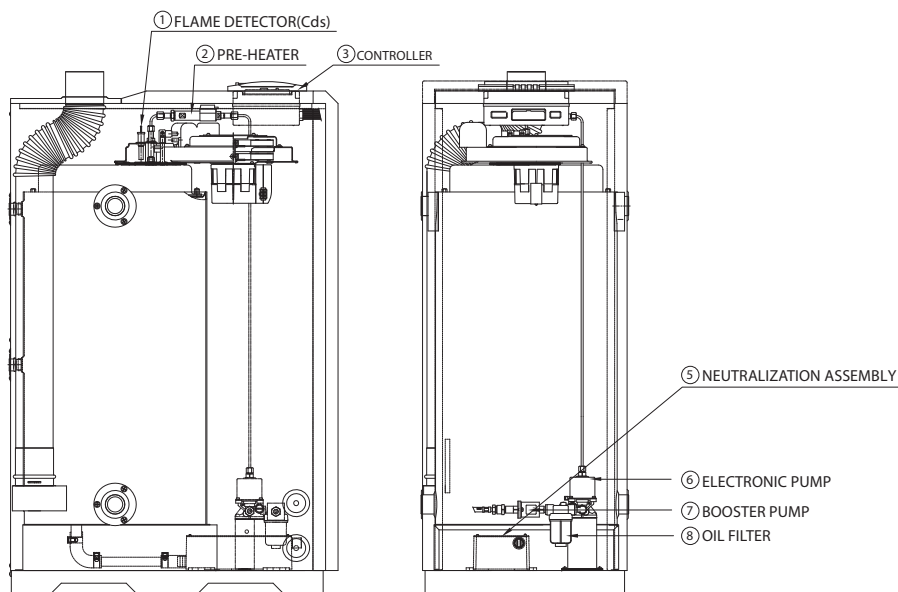
If ignition fails the "CHECK" light will show. In this case press the power button again to reset. If successive flame failures occur contact the Technical.



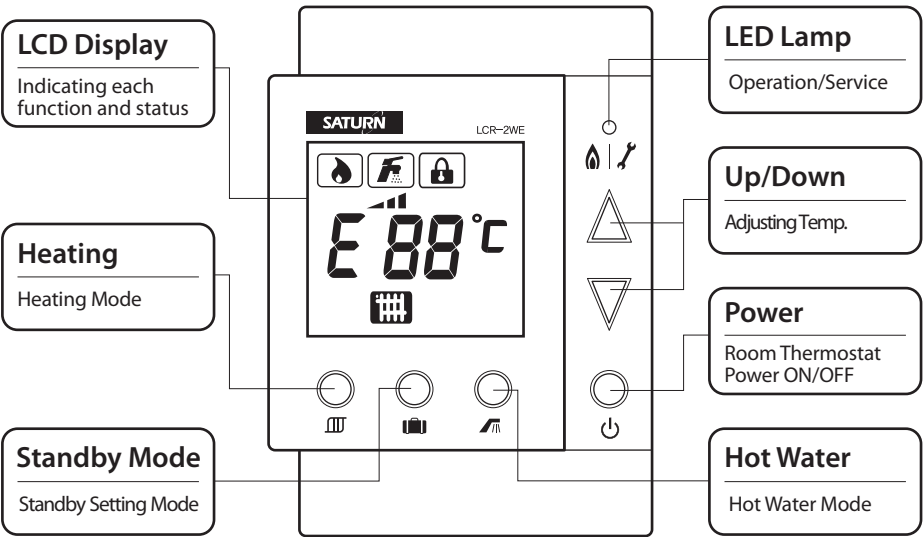
Component Overview

The structure of the boiler

ModelNo: NHC 25B/30B/41B



Room Thermostat(LCR-2WE)



LCD

88°C

Temperature



Operation
Indicator



Heating
Mode



Standby
Mode

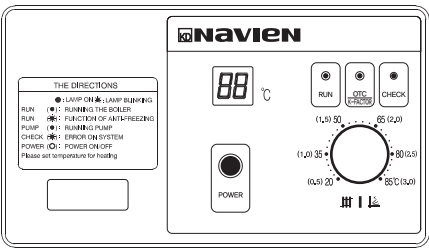


Hot water
Mode



Hot water Temperature
(Lo/Mid/Hi)

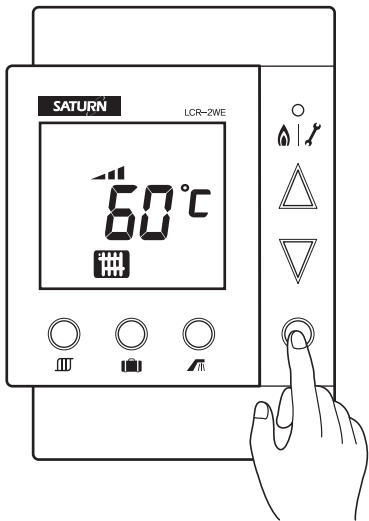
Operation and display panel (KDC-106M)



LED indicate the temp of heating water, the value of K-Factor, and occurrence of trouble displayed the failure code

※ See page 16 for Error Code Table

Room Thermostat On/Off

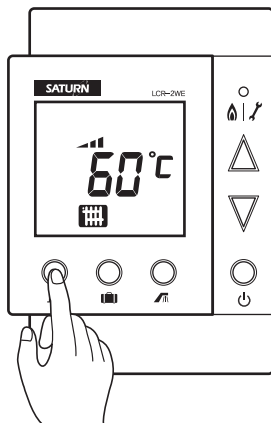



LCR-2WE Programmer

The LCR-2WE remote control panel will activate by pushing the power on/off button.

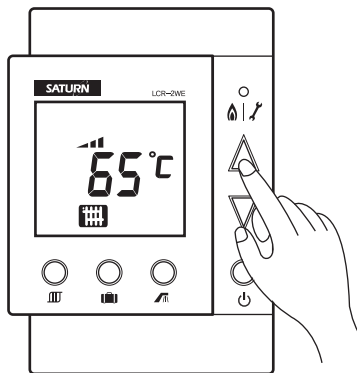
Heating mode



Press the  button.



 blinks when selecting Room Temp. Mode

Set the heating temp. with Δ/∇ button.

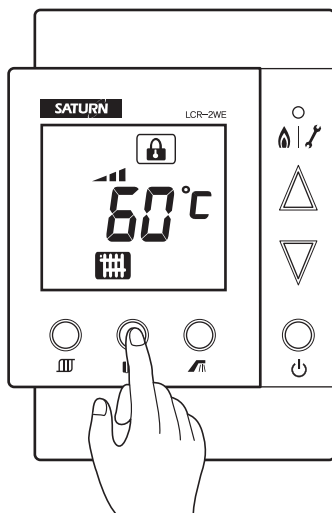


when  blinks, set the desired heating temp. between 40~80°C by adjusting Δ/∇ button, after a while, it is automatically saved. Heating temp. can be set by 1°C. After the required temperature has been selected,  is on and current heating water temp. is displayed.


The LCR-2WE room thermostat is designed to control a heating system according to time and temperature, in connection with a valve controller (red colored cable).


Vacation/Standby Mode

If you are not at home, you can set the Standby Mode to save heating energy by pressing.



Press  button.

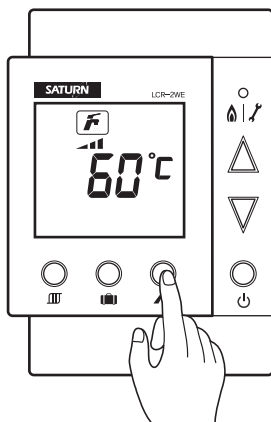
 will be displayed and Standby Mode will be set.

To cancel vacation/standby mode press the  button to return to the heating mode.

Hot Water Mode

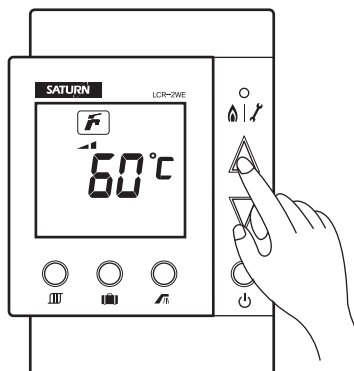
Use this function only when hot water is needed.

Press  button.

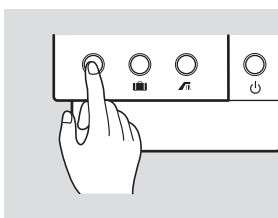



 will be displayed and Hot Water Mode will be set .

Set the heating temp. with Δ/∇ button.



Adjusting hot water temp. by 3step; Low load, Medium load , High load capacity of combustion.



You can determine whether the changeover from DHW mode to Heating mode by pushing "  " button.



1. Please be careful that infants and young children do not use hot water without a guardian present.
2. While others are using hot water, do not change the hot water temp. setting for safety.

Fault Codes

Fault codes take priority over all other display functions in the event of a system fault occurring and the LCD shows one of the following numeric error codes with letter 'E'.

If multiple faults occur, the corresponding fault codes are displayed alternately for about two seconds each.

Fault at the boiler

Error Code	Cause
02	Low water level
03	Misfire
04	Pseudo-flame
05	Temp. sensor wire disconnected
06	Short circuit of Temp. sensor
12	Misfire in combustion
16	High limit thermostat

Fault at the room controller

Error Code	Cause
51	Electrical backup system failure
52	Functional button defective

Electrical backup

The LCR-2WE retains the setting parameters when the power supply to the boiler is turned off or shut down by power outages and back to the preset operation.

When the red LED lights up

Please contact your local shop and distributor for service solutions.

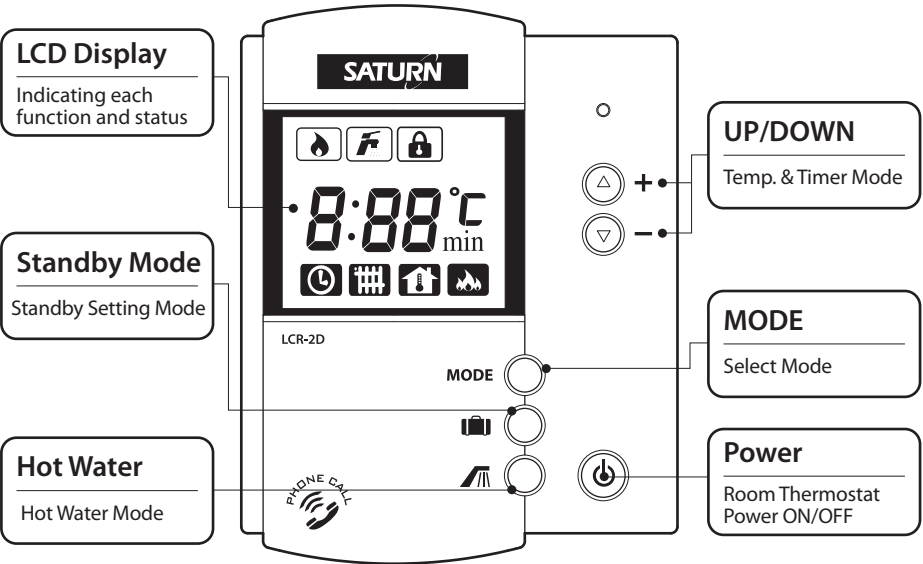
When the green LED lights up

Check to see if zone control valves are defective then contact your local shop and distributor for service solutions, meanwhile heating can be supplied thru an interim measure to operate the valve manually.

Check the output signal wire connections.

If the boiler operates the heating mode then adjustment of setting temperature of heating is needed.

Room Thermostat (LCR-2D)



LCD

88°C
Temperature


Operation Indicator


Hot water Mode


Standby Mode

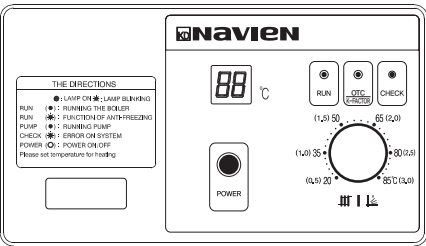

Timer Heating


Heating Water Temp.


Room Temp


Power Heating

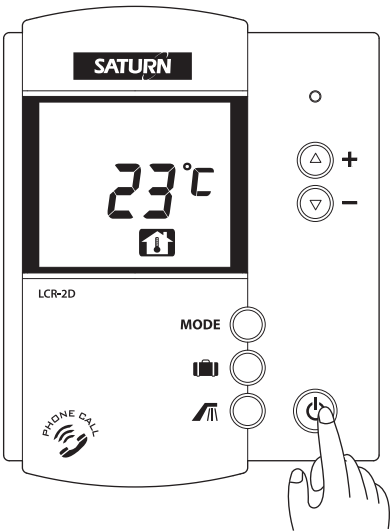
Operation and display panel (KDC-106M)



LED indicate the temp of heating water, the value of K-Factor, and occurrence of trouble displayed the failure code

※ See page 41 for Error Code Table

Room Thermostat On/Off

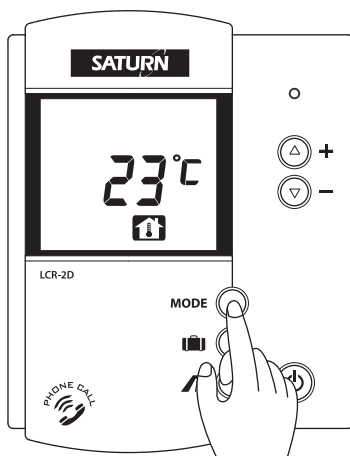



LCR-2D Programmer

The LCR-2D remote control panel will activate by pushing the power on/off button.

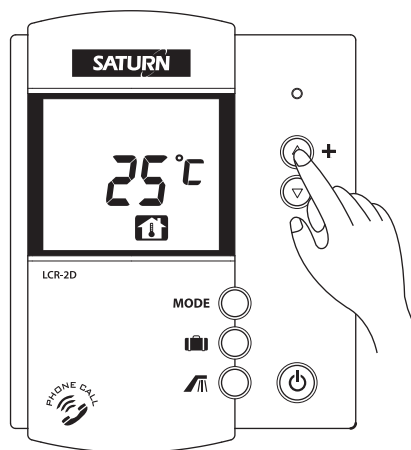
Room Temp. Mode



Press the Mode button repeatedly, until  is displayed.



 blinks when selecting Room Temp. Mode

Set the heating temp. with +/- button.



When  blinks, set the desired heating temp. between 10~40°C by adjusting +/- button, after a while, it is automatically saved. Heating temp. can be set by 1°C. After the required temperature has been selected,  is on and current room temp. is displayed.




CAUTION

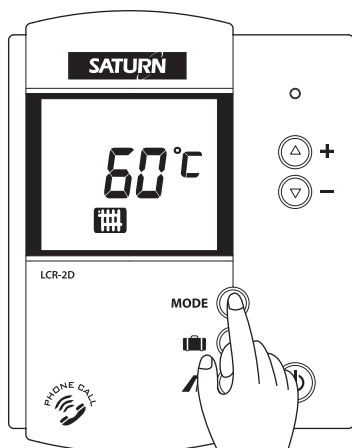
If a room thermostat is programmed with Room Temp. Mode and it is placed in the following places when using Room Temp. mode, it may result in some false readings.


1. Frequently opened and closed door and/or drafty place.
2. Areas exposed to sunlight or high humidity levels.
3. A place under direct influence from heat, such as radiator.

In that case, heating water temp. is recommended.

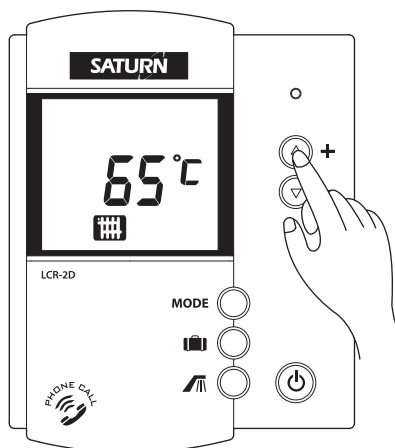
Heating Water Temp. Mode



Press the Mode button repeatedly, until  is displayed.



 blinks when selecting Heating Water Temp. Mode

Set the heating temp. with +/- button.

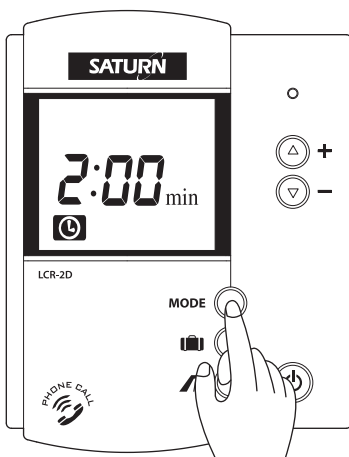


When  blinks, set the desired heating temp. between 40~80°C by adjusting +/- button, after a while, it is automatically saved. Heating temp. can be set by 1°C. After the required temperature has been selected,  is on and current heating water temp. is displayed.

Timer Mode

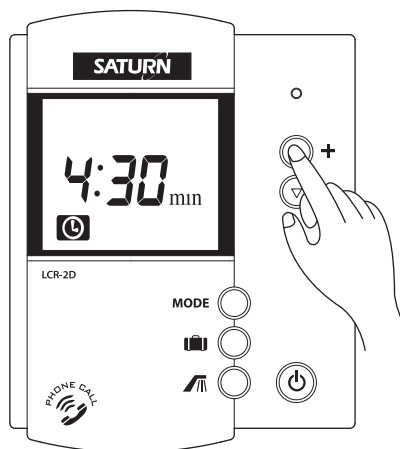
In this case the Timer mode is a manual over-ride to allow the home owner to boost the heating as required. A separate 2 or 3 channel programmer is required as normal.



Press the Mode button repeatedly, until  is displayed.



 blinks when selecting Timer Mode.

Set the heating stop time with +/- button

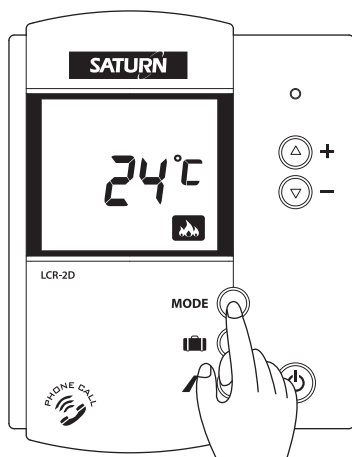


When  blinks, set the desired heating stop time. It can be set between 10 & 15 minutes in the range of 0-9 hours by adjusting +/- button, after a while, it is automatically saved. After the required temperature has been selected,  is on and current room temp. is displayed.




Selecting a stop time of '0' means the boiler is always active. The boiler is then controlled by an external 7 day programmer/time clock.

Boost Mode

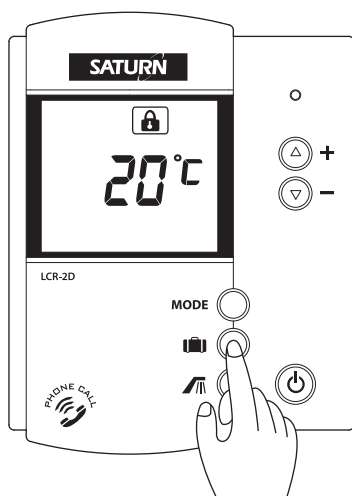


Press the Mode button repeatedly, until  is displayed.


When selecting Boost Mode,  is displayed and the boiler will run for 30 minutes continuously. After 30 minutes, it returns to previous Heating Mode.

Vacation/Standby Mode

Selecting this mode allows the boiler to operate at minimum capacity when there is no one at home. It does not over-ride the frost protection features of the boiler during winter.



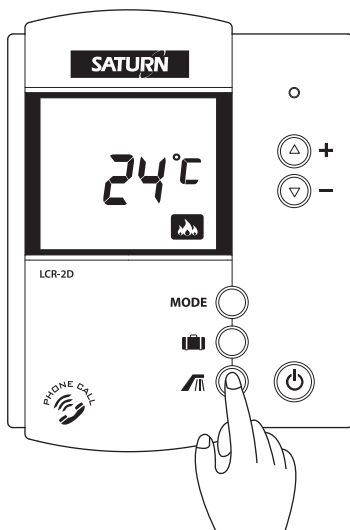
Press  button

 will be displayed and Standby Mode will be set.


To cancel vacation/standby mode press the mode button to return to the desired heating mode.

Hot water Mode

Use this function only when hot water is needed.



Press  button.

 will be displayed and Hot Water Mode will be set.

In hot water mode the boiler temperature will not exceed 60°C to avoid excessive energy use.

Press the MODE button and select the desired Heating Mode to cancel the Hot Water Mode.



CAUTION

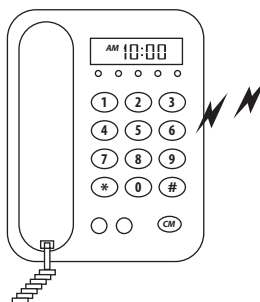
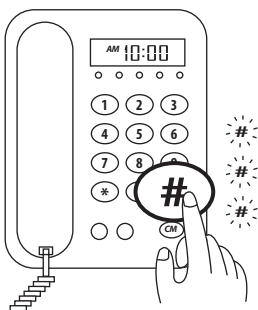
1. Please be careful that infants and young children do not use hot water without a guardian present.
2. While others are using hot water, do not change the hot water temp. setting for safety.

Remote operation by telephone (LCR-2D only)

With a phone network, the heating function of the room thermostat can be set.

Activating the boiler

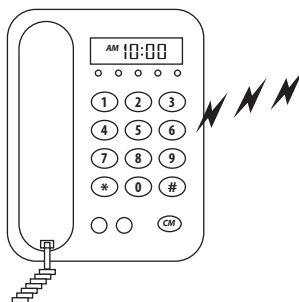
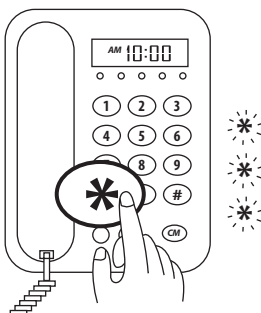
1. Press "#" button 3 times.
2. Hang up the phone, when hearing 'beep-beep' sound.



The boiler is operated in 'Boost Mode' for 30 minutes and then returns to the previous mode (If the room thermostat is off, return to Standby Mode.)

Suspending the boiler

1. Press "*" button 3 times.
2. Hang up the phone, when hearing 'beep-beep' sound.
Then, it's changed to Standby Mode

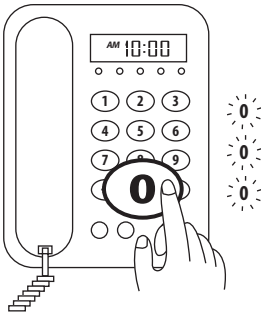


TIP

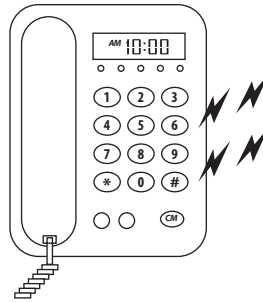
When using an outside telephone, call the phone, once the call is connected to the boiler after ringing the preset number of times, you will hear a 'beep' sound. Then, follow the steps as described above.

To alter the number of rings

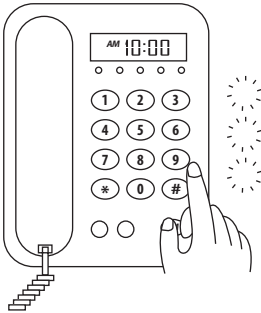
1. Press "0" button 3 times.



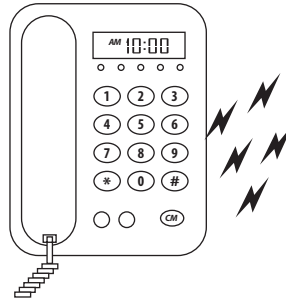
2. 'beep-beep-beep-beep' sound will be ring 4 times.



3. Press a button you select out of 5,6,7,8,9, or 0 three times.



4. After 'beep-beep-beep-beep-beep' sound, hang up the phone.

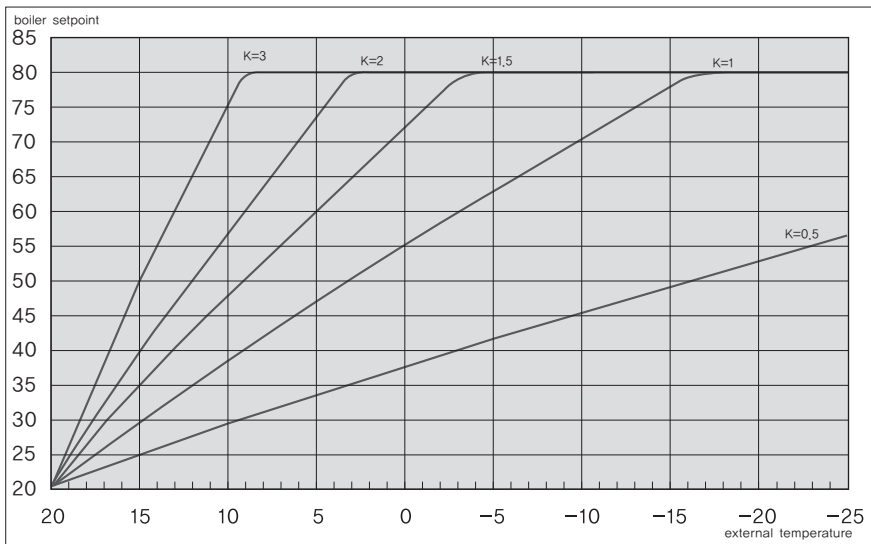


1. If you don't press any buttons for 10 seconds or longer after pressing '#' or '*' button, the telephone will automatically hang up.
2. Make sure to hang up the phone after hearing activation or suspension signal.
3. If you don't hear the 'beep' sound while using it, follow steps again slowly.

OTC Mode

If an outdoor temperature probe is connected, the weather compensation function can be used.

- 1) With this function, the target primary temperaturis automatically set according to the outdoor temperature (K-Factor)
- 2) When the outdoor temperature sensor is connected, OTC lamp is turned on
- 3) Each time the Outdoor Temperature sensor should be placrd, comply with the instruction and to avoid areas with temperature fluctuations caused by direct sun exposure.
- 4) Ensure the Outdoor Temperature sensor should be placed with a constant temperature of Outside.

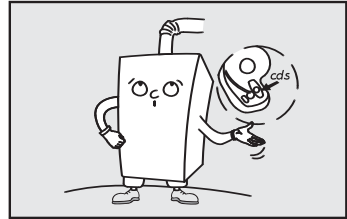


K-Factor

Safety devices

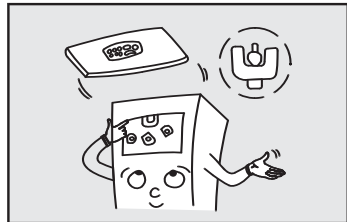
Ignition safety device

When the boiler does not ignite, or if the flame fails the flame detector (photocell) will deactivate the boiler.



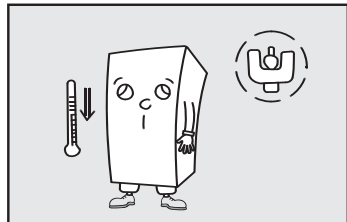
Low water level safety device

If the water level is insufficient in the boiler the low water level sensor will deactivate the boiler. Once the system is adequately refilled this will automatically reset.



Overheat prevention

If the temperature of the boiler rises to dangerously high levels the overheat sensor will deactivate the boiler. In this instance the "CHECK" light will show. Once the temperature has dropped to safe levels the boiler will auto-reset and the "RUN" light will show.

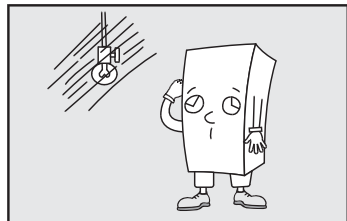


Frost freezing prevention

During times offrost risk the boiler will activate the circulating pump and/or the burner as required to eliminate the risk offreezing. For this reason, power must be maintained to boiler, even if the system is not in use.

Power-failure protection

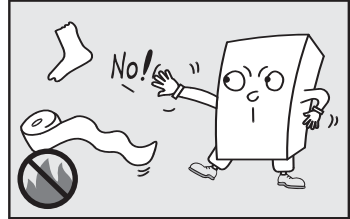
In the event of power failure the oil supply will automatically be isolated from the combustion chamber.



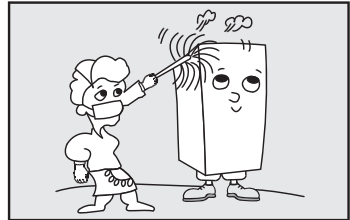
Everyday checks

Points to be checked once or more a year

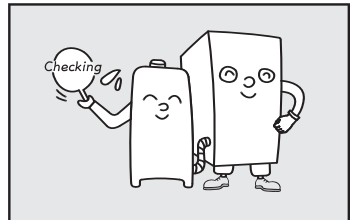
Ensure that combustible materials are not stored near the boiler.



Keep the area around the boiler clean and free from obstruction to allow for free air flow.



Check for fuel leaks within the fuel storage/supply system and check for water leaks within and around the boiler.



Inspect the inside of the oil tank for water or debris.



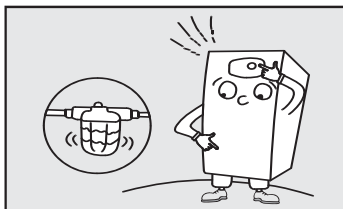
Cleaning of the boiler

Soot build-up within the boiler will reduce its operating efficiency and life expectancy. The boiler should be serviced annually by an approved service engineer.

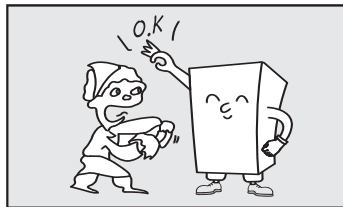


Cleaning the oil filter

To clean the oil filter, first isolate the oil supply. Remove the oil cup by turning right and left and by simultaneously pulling the cup downwards.



Wash the filter and the inside of the oil cup using clean kerosene.



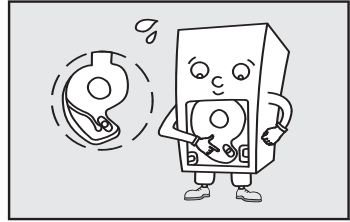
Cleaning the oil tank

The oil tank should be checked during the annual service and cleaned of all water and debris as required.

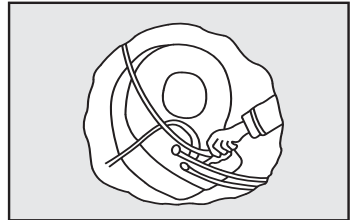


Cleaning the flame detector

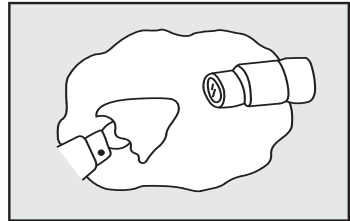
If the flame detector (photocell) becomes sooty or dirty the reduced sensitivity will cause erratic and incorrect boiler operation.



Remove the flame detector (photocell) which is located at the top of the burner.

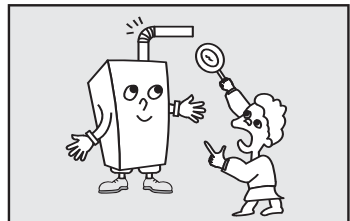


Wipe the glass surface of the flame detector (photocell) using a clean rag and replace.



Checking the flue pipe

During the annual service the flue system should be checked for correct installation, blockages, corrosion or leakage. Any abnormalities found should be rectified immediately.



How to install

Choosing of the installation place

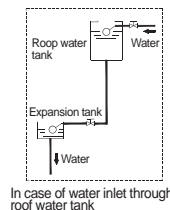
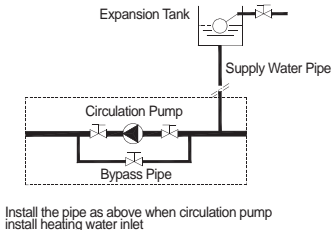
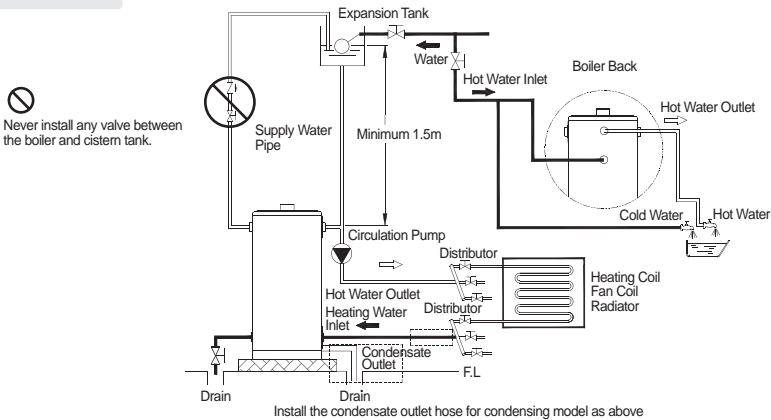
Choose an installation site that allows easy access for installation, maintenance and operation.

When choosing an installation site, take care to conform to all local regulations and standards. Allow as much free space around the boiler as possible for maintenance and reduced fire hazard. Ensure that the boiler is accessible in order to allow for easy adjustment of the boiler temperature.

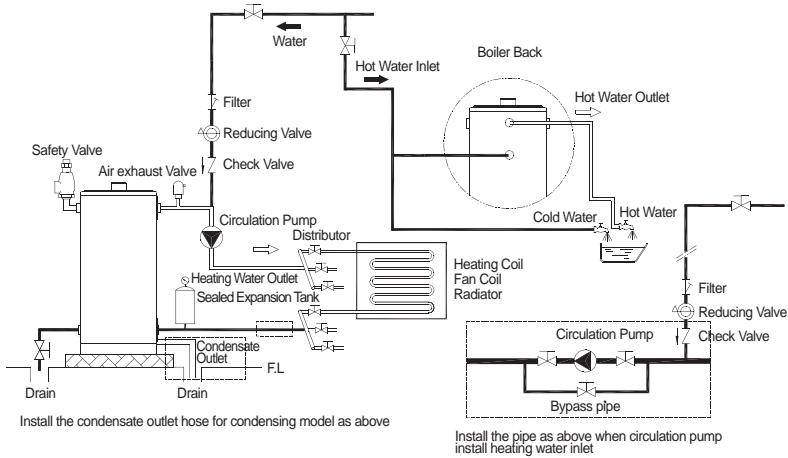
The boiler should not be sited close to storage areas of combustible materials. Consider condensate and boiler drainage requirements when choosing the boiler location.

The diagram of the standard piping: Cistern tank install type

Open cistern tank



Sealed System



Precautions

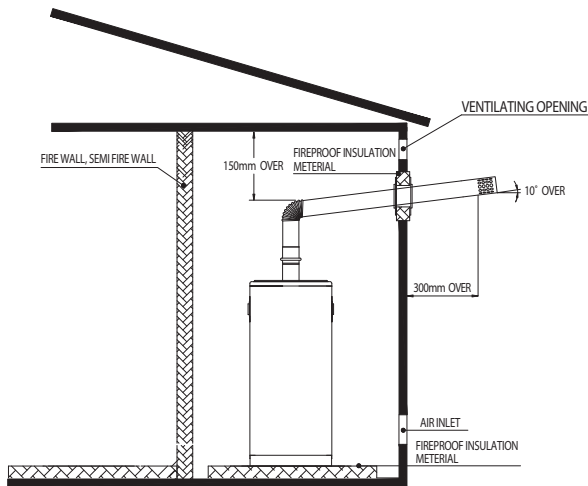
1. The system should be installed with a pressure safety valve rated to 3.5 Bar or less.
2. The maximum operating pressure is 3.5 Bar. Neither the boiler nor any connected pipe work should be exposed to pressures in excess of this.
3. Always install the boiler and the connected system according to local regulations.

Example of a standard installation

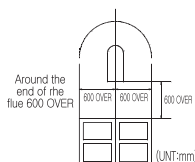
Flue Installation

It is recommended that the flue system not exceed 3 meters in length and that no more than 2 bends be used.

Condensing boiler model : NHC25B/30B/41B

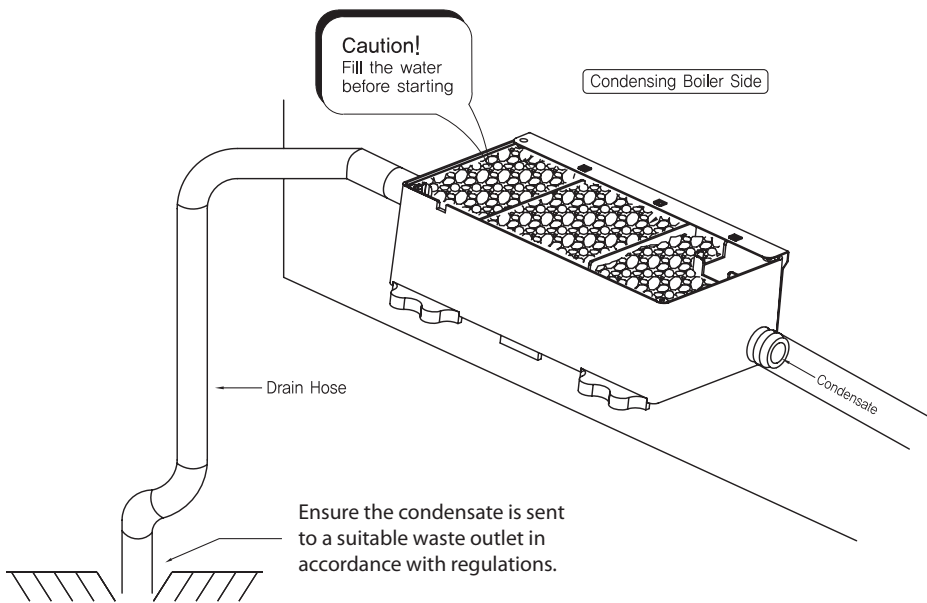


The flue should be installed at an angle of no more than 10°. The flue should be made from heat-resistant non-corrosive material.



Allowing combustion gases to re-enter the boiler room can result in a build up of carbon monoxide which could result in poisoning. Saturn recommends the installation of a suitable carbon monoxide detector where possible.

1. Condensate is produced when the condensing boiler is running and should be piped to the drainage system.
2. Link the drain hose with the outlet of the neutralization system which is located at the bottom of boiler and then connect the end of the hose to a soak pit.
3. Please make sure that the neutralizer in the boiler is filled with water.
4. The condensate drain system should be installed to minimise the risk of freezing.



Room thermostat Installation

Safety (Electrical connection)

1. Room thermostat is mounted correctly and electrically connected.
2. The operating voltage of the LCR-2WE is DC 20V current supplied by the boiler controller.
Do not connect to any power supply voltage to the connections AC110/220 and DC power, risk of damage to electronics!

Safety (Installation)

1. Install the room thermostat in dry rooms only and if the room thermostat is located in the places that exposed to sunlight or high humidity levels, it may result in some false readings.
2. Mount the room thermostat in such a way that the room temperature can be properly evaluated; e.g. on an internal wall of the main living room, at the height of approx. 1.5m.
3. Please make sure that the air in the room can circulate freely and that the room thermostat is not obscured by furniture, curtains or other objects.
4. All wiring must be connected to valve controller properly, risk of damage of electronics.
5. The disposal of the transportation packing is undertaken by the specialist company that installed the equipment.

Safety (Use)

1. The room thermostat may only be installed by a suitably qualified engineer.
This engineer also assumes responsibility for installing the room thermostat properly and putting it into service for the first time.
2. Connections carrying voltage!
There is a danger to life from electric shock when working in the switch box of the boiler.
Switch off the power supply to the switch box of the boiler and secure against reconnection before carrying out any work.
Only open the switch box if the boiler is potential free by a suitably qualified engineer.
3. Clean the casing of room thermostat with a soft cloth.
Do not use any scouring or cleaning agents which could damage the operating elements or the display.
4. To ensure regular servicing is strongly recommended to make it by a suitably qualified engineer.
5. Any other use or extended use is considered to be used other than intended.
The manufacturer or supplier is not liable for any resulting damage.
The user alone bears any risk.

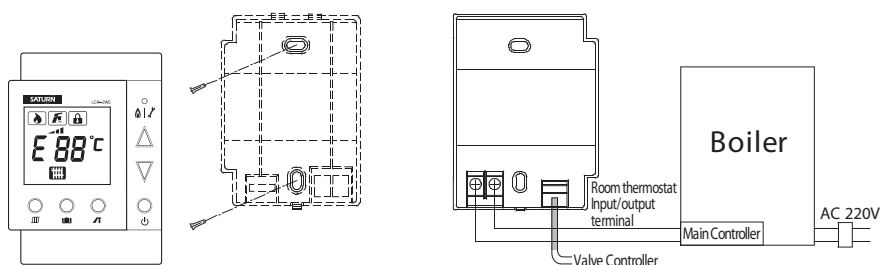
Room thermostat (LCR-2WE)

All wiring must be in accordance with its instructions for connections with the valve controller and unused wire should be insulated and short-circuited.

1. Connect the cables of room thermostat properly to the terminal of valve controller in accordance with following each colored cable;
 - Red : Heating
 - Blue : Fault signal
 - Yellow : Combustion signal

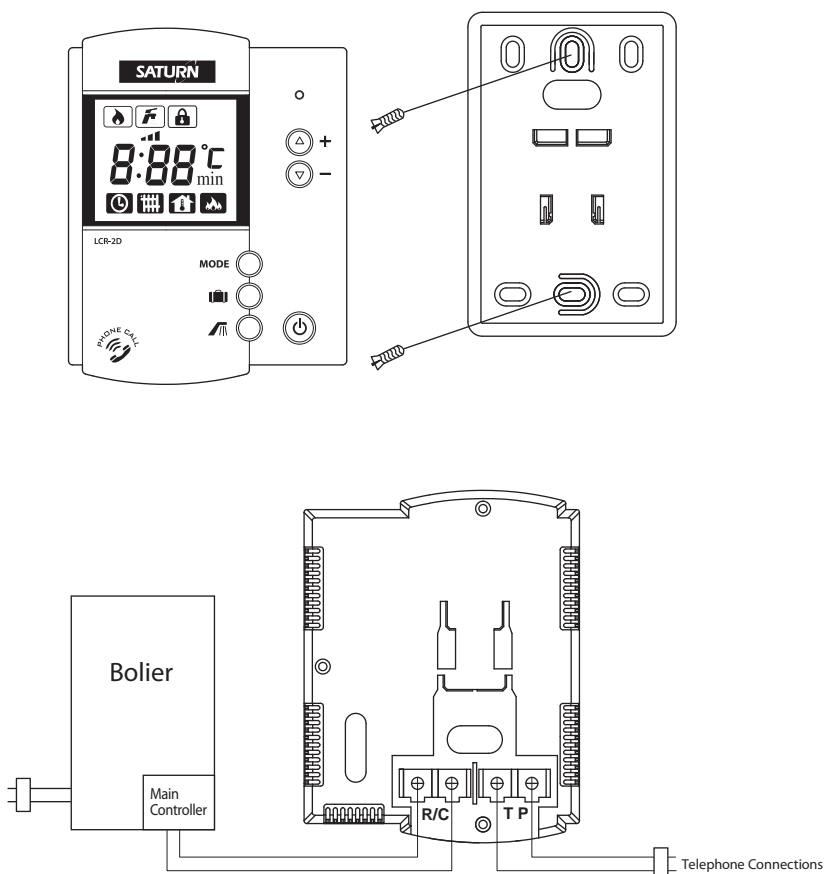
Unused wire should be insulated and short-circuited

2. The pin rail on the back of the thermostat must connect to 2 cables from the boiler.
3. Fix the wall socket with the screws provided.
4. Carefully push and fit the thermostat on to the wall socket until it clicks in position.



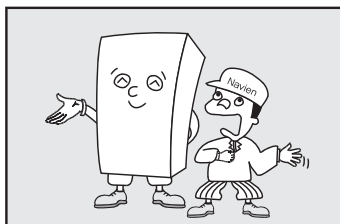
Room thermostat (LCR-2D)

1. Fix the bracket by using screws.
2. Connect firmly the two wires from the boiler to the terminals on the back of the room thermostat.
3. Connect firmly the two wires from the telephone code to the terminals on the back of the room thermostat.
4. Fix the room thermostat on the bracket.



How to replace the parts

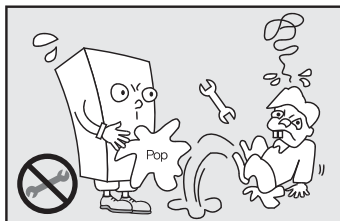
There are no parts which gets wear in a short period, but when the replacement of the parts is needed. Consult to out sales agency or commercial agency.



For the repair of the boiler, request to our sales agency or commercial agency, or to the A/S center.





Repairing the boiler by a man without qualification cause another trouble, so never do that.



MODELNO : NHC 25B, 30B, 41B



Troubleshooting

Happening	Cause	Solution methods
1. On pressing the power button, the motor doesn't work	1. The temperature in the boiler is above the set temperature. 2. The room controller is off. 3. Others.	1. This is not a problem. When the temperature of the boiler goes down, it will restart. 2. Set the room controller to the operation condition. 3. Contact the sales agency or commercial agency.
2. The motor rotates, but the boiler doesn't ignite.	1. The oil valve is locked. 2. There is no oil in the tank. 3. There is air in pipes. 4. The oil filter is blocked. 5. Others.	1. Open the valve. 2. Supply oil. 3. Drain off air. 4. Clean the boiler. 5. Contact the sales agency or commercial agency.
3. The boiler ignites, but immediately stops.	1. The oil in the oil tank is insufficient. 2. The flame detector(CdS), cannot sense. 3. The oil filter is blocked. 4. Impurities into the oil supply 5. Others.	1. Supply oil more. 2. Clean the flame detector. 3. Clean the oil filter. Replace the oil with good oil. 4. Contact the sales agency or commercial agency.
4. The electronic pump makes noise	1. The oil filter is blocked. 2. There is air in the pipes. 3. Others.	1. Clean the oil filter. 2. Drain off air. 3. Contact the sales agency or commercial agency.
5. On igniting, it backfires.	1. Wind back-flow into the flue pipe. 2. Electrode fault. 3. Others.	Contact the sales agency or commercial agency.
6. Abnormal combustion noise.	1. The air for combustion is excessive. 2. The amount of oil feed is excessive. 3. Others.	Contact the sales agency or commercial agency.
7. Smoke and soot build up.	1. The oil is bad or has impure materials. 2. The air for combustion is short. 3. Others.	1. Replace the oil. 2. Contact the sales agency or commercial agency.
8. The appliance does not go into OTC mode	1. The Outdoor Temperature sensor is not connected correctly. 2. OTC mode turns off during Hot Water activation	Check that the Outdoor Temperature sensor has been connected properly Check the OTC mode is working by returning to Central Heating mode (Press the Mode button repeatedly, until  or  is displayed.)
9. Others.	1. The fuel pipes leak. 2. The water pipes leaks.	Contact the sales agency or commercial agency.

Please contact your local shop and distributor for other unclear matters.

Fault Codes

When an error occurs, the LCD shows one of the following numeric error codes with letter 'E'.

Error Code	Cause
02	Low water level
03	Misfire
04	Pseudo-flame
05	Temp. sensor wire disconnected
06	Short circuit of Temp. sensor
12	Misfire in combustion
16	High limit thermostat

Specifications

SATURN CONDENSING OIL BOILER						
ITEM		UNIT	MODEL	NHC 25B	NHC 30B	NHC 41B
HEAT OUTPUT	CONDENSING	kW		25	30	41
		Btu/h		85,000	103,000	139,000
	NORMAL	kW		24	29.5	38
		Btu/h		81,000	101,000	129,000
HOT WATER OUTPUT			kW	24	29.5	38
			Btu/h	85,000	103,000	129,000
FOR USE				HEATING AND HOT WATER		
FUEL				Heating Oil(Kerosene, Light Oil)		
BUILDING SIZE			m²	Less than 132	Less than 165	Less than 232
MAXIMUM WORKING PRESSURE			Bar	3.5 (343)		
			(kPa)			
HEAT TRANSFERING SIZE			m²	1.60	2.08	2.40
FUEL CONSUMPTION			ℓ/L	2.52	3.12	4.03
TYPE OF AIR / EXHAUST GAS				FE		
HEATING EFFICIENCY	CONDENSING	%		101	101	101
	NORMAL	%		95	95	95
HOT WATER EFFICIENCY			%	95	95	95
ELECTRICITY CONSUMPTION	COMBUSTION	W		140	150	175
POWER			V, Hz	220V, 50Hz		
WATER STORAGE CAPACITY			ℓ	34.0	41.0	48
EXTERNAL SIZE			W×L×H	410X665X1,031	444X706X1,051	444X706X1,186
			mm			
WEIGHT			kg	59	64	72.0
PIPING	HEATING CONNECTION	A	1"			
	HOT WATER CONNECTION	A	1/2"			
DIAMETER OF FLUE			Φmm	EXHAUST : 75		

The specification in this operating manual can be changed for improvement without prior notice.



BO-E-M-10-3